

IN THE CLAIMS

1. A thermoplastic resin composition for laser welding comprising:

5      1) thermoplastic resin; and

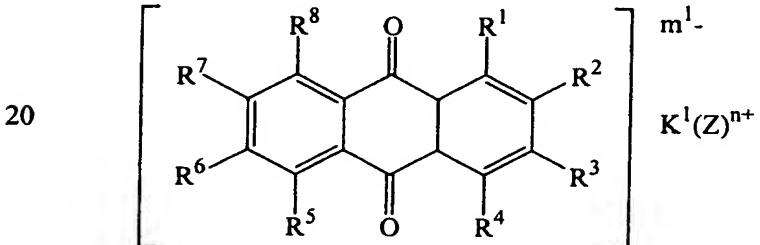
2) laser-transmitting black colorant comprising amine salt of anthraquinone dye.

2. A thermoplastic resin composition for laser welding comprising:

10     1) thermoplastic resin; and,

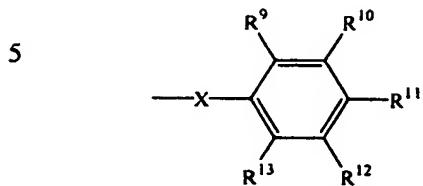
2) laser-transmitting black colorant comprising amine salt of anthraquinone dyes of formula [I] or formula [II],

wherein Formula [I] is:

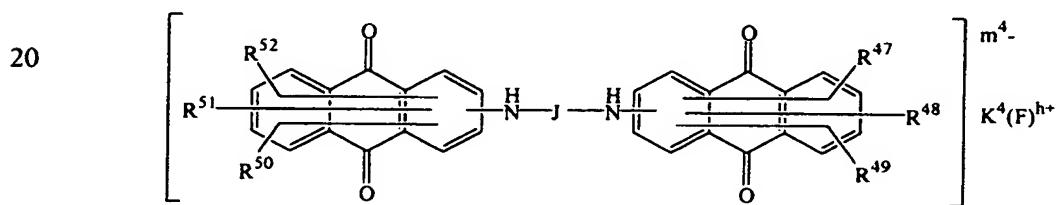


wherein  $\text{R}^1$  to  $\text{R}^8$ , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxycarbonyl, cyclohexylamide, sulfonyl, formula [I-a], or -Y-W, and at least one of  $\text{R}^1$  to  $\text{R}^8$  is of formula [I-a]; wherein Y is S, O, or NH; wherein W is selected from unsubstituted or substituted alkyl group, alkenyl group, and unsubstituted or substituted aryl group; wherein  $(\text{Z})^{n+}$  represents ammonium ion or a cation derived from an organic amine compounds or a basic dye; wherein n is 1 or 2,  $m^1$  is an integer from 1 to 4 and  $\text{K}^1$  is the ratio of  $m^1 / n$ ;

and wherein formula [I-a] is:



10 wherein X is O or NH, and R<sup>9</sup> to R<sup>13</sup>, which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alcoxycarbonyl, or sulfonyl; wherein at least one of R<sup>1</sup> to R<sup>8</sup> and R<sup>9</sup> to R<sup>13</sup> is sulfonyl group; and wherein  
15 formula [II] is:



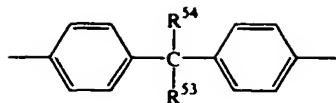
wherein R<sup>47</sup> to R<sup>52</sup>, which may be the same or different, are independently selected  
30 from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alcoxycarbonyl, or sulfonyl; and at least one of R<sup>47</sup> to R<sup>52</sup> is of sulfonyl; and

35 Formula J in formula [II] is selected from formula [II-a] or formula [II-b] and binds two anthraquinone,

Wherein formula [II-a] is:



50 and formula [II-b] is:

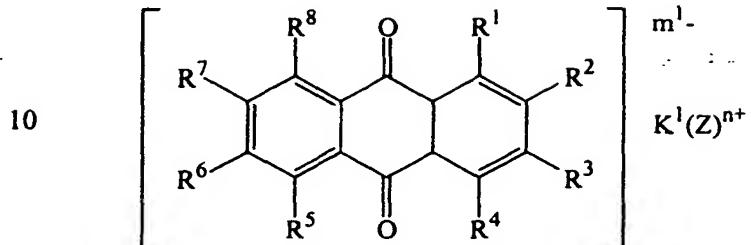


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wherein R<sup>53</sup> to R<sup>54</sup>, which may be the same or different, are independently selected from the group consisting of alkyl(having 1 to 8 carbon atoms) or hydrogen ; and wherein (F)<sup>h+</sup> represents ammonium ion or a cation derived from an organic amino compounds or a basic dye wherein h is 1 or 2, m<sup>4</sup> is an integer from 1 to 4 and K<sup>4</sup> is the ratio of m<sup>4</sup>/ h.

- 15 3. The composition of claim 1 further comprising a second dye mixed with said amine salt of said anthraquinone dye to produce a laser-transmitting black dye.
- 20 4. The composition of claim 2 further comprising a second dye mixed with said amine salt of a said anthraquinone dye to produce a laser-transmitting black dye.
- 25 5. The composition of Claim 4, wherein said second dye is selected from the group consisting of perinone dyes, monoazo complex dyes, anthrapyridone dyes and anthraquinone dyes.
- 30 6. The composition of Claim 2 further comprising (i) a red dye to be mixed with said amine salt of said anthraquinone dye to produce a laser-transmitting black dye, said red dye selected from the group consisting of perinone dyes, monoazo complex dyes, and anthrapyridone dyes; and (ii) an additional yellow dye to be added to said mixture selected from the group consisting of monoazo complex dyes and anthraquinone dyes.
- 35 7. The composition of any one of claims 1-6 in which said thermoplastic resin is polyamide or polyester.
8. The composition of Claim 7, further comprising reinforcing agent.
9. A laser-transparent article formed from the composition of any one of Claims 1-6.
10. An article formed by laser welding an opaque article with the laser-transparent article of Claim 9.
11. A laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising at least amine salt of anthraquinone dyes.
12. A laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising amine salt of anthraquinone dyes of formula [I] or
- 40 formula [II],

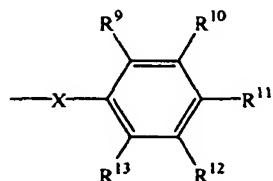
wherein Formula [I] is:



wherein  $R^1$  to  $R^8$ , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxy carbonyl, cyclohexylamide, sulfonyl, formula [I-a], or -Y-W, and at least one of  $R^1$  to  $R^8$  is of formula [I-a]; wherein Y is S, O, or NH; wherein W is selected from unsubstituted or substituted alkyl group, alkenyl group, and unsubstituted or substituted aryl group; wherein  $(Z)^{n+}$  represents ammonium ion or a cation derived from an organic amine compounds or a basic dye; wherein n is 1 or 2,  $m^1$  is an integer from 1 to 4 and  $K^1$  is the ratio of  $m^1 / n$ ;

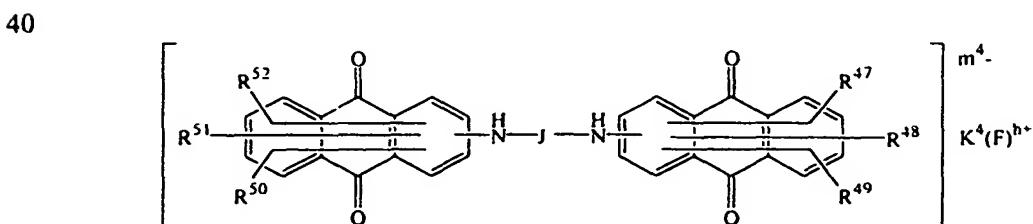
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and wherein formula [I-a] is:



wherein X is O or NH, and  $R^9$  to  $R^{13}$ , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxy carbonyl, or sulfonyl; wherein at least one of  $R^1$  to  $R^8$  and  $R^9$  to  $R^{13}$  is sulfonyl group; and wherein formula is [II]:

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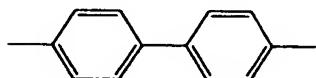


5 wherein R<sup>47</sup> to R<sup>52</sup>, which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxycarbonyl, or sulfonyl; and at least one of R<sup>47</sup> to R<sup>52</sup> is of sulfonyl; and

10 Formula J in formula [II] is selected from formula [II-a] or formula [II-b] and binds two anthraquinone,

Wherein the formula [II-a] is:

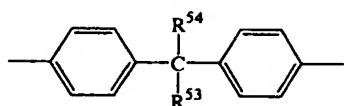
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and wherein the formula [II-b] is:

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wherein R<sup>53</sup> to R<sup>54</sup>, which may be the same or different, are independently selected from the group consisting of alkyl(having 1 to 8 carbon atoms) or hydrogen ; and wherein (F)<sup>h+</sup> represents ammonium ion or a cation derived from an organic amino compounds or a basic dye wherein h is 1 or 2, m<sup>4</sup> is an integer from 1 to 4

45 and K<sup>4</sup> is the ratio of m<sup>4</sup>/ h.

13 .The composition of Claim 12, where in the laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising at least amine salt of anthraquinone dyes of formula [I] where as at least one of R<sup>9</sup>, R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> and  
5 R<sup>13</sup> of formula [I-a] is sulfonyl group.

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